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ciatively to Professor Kate Gordon's exposition of the subject. The reviewer, while sympathizing with Mr. Doan's general position, feels that in his effort to stress the functional pluralism of the moral life he has unduly neglected the even more important functional unifications of experience. And if "the kind and degree of emotive peace" are to be made the ethical sanction, it seems essential to estimate and analyze these "kinds and degrees," in order to avoid repeating, under a new terminology, John Stuart Mill's begging of the utilitarian question.

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*The Cause of the Treppe.* FREDERIC S. LEE. *The American Journal of Physiology,* April, 1907. Pp. 267–282. *The Action of Normal Fatigue Substances on Muscle.* FREDERIC S. LEE. *Ibid.,* October, 1907. Pp. 170–179.

Treppe is the name given by Bowditch to the familiar phenomenon of skeletal muscle, that with stimuli uniform in strength the later contractions are stronger than the earlier ones; a phenomenon which is probably very closely related to that which Exner has called *Bahnung,* and therewith to "summation" in general. Lee finds that "the treppe of skeletal muscle is due to the augmenting action on the muscle protoplasm of fatigue substances present in small quantity"; while if present in greater quantity, their effect is depressive. This "chemical theory of the treppe may be extended to the explanation of the mysterious process known as summation of stimuli. As applied in its usual sense to contractile tissues, the term means the phenomenon wherein a stimulus, too weak to cause a contraction when applied singly, becomes efficient when repeated. A subminimal stimulus may thus pass the threshold and become minimal and even supraminimal, . . . and it is generally acknowledged that the chemical changes of muscular activity occur, in large part at least, during the period of the excitatory stage rather than during the subsequent mechanical stage."

Since the augmenting action of fatigue substances occurs in both curarized and non-curarized muscles, there is no doubt that "fatigue substances act directly on the protoplasm of the muscle cells. This, however, leaves still open the question as to whether they may not also depress the substance of both nerve fibers and intramuscular nerve-endings." "With the central nervous system carbon dioxide is an undoubted product of activity, and there is no inherent improbability in its acting as a factor in making paths of conduction that have once been traversed more easy of subsequent passage." Sherrington, in his "Integrative Action of the Nervous System," states that temporal summation and *Bahnung* are exhibited by reflex-arcs in much higher degree than by nerve-trunks, and he ascribes this fact, for obviously good reasons, largely to the synapses of the reflex-arcs. It should seem that there are two causes for the summation of stimuli.

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